

WHAT IS CLAIMED IS

5

1. A light source drive which modulates a light source so as to cause the same to emit a light, comprising:

10 a waveform shaping part which corrects a deformation of a light waveform of the light to be emitted from said light source.

15

2. A light source drive which modulates a light source so as to cause the same to emit a light, comprising:

20 a superposition current generation part which generates a superposition current approximately corresponding to a charging/discharging current needed for a capacitance occurring in parallel to said light source for a predetermined time period near at least one of a rising-up part and a decaying-down part of a
25 waveform of a drive current for said light source; and

an addition/subtraction part which adds to or subtracts from the drive current the superposition current generated by said superposition current generation part.

5

3. The light source drive as claimed in claim
10 2, further comprising:

a superposition time control part which controls a superposition time according to said capacitance for which the superposition current is generated.

15

4. The light source drive as claimed in claim
20 2, further comprising:

a superposition current control part which controls the superposition current according to said capacitance.

25

5. The light source drive as claimed in claim 2, further comprising:

a superposition time control part which controls a superposition time according to said
5 capacitance for which the superposition current is generated; and

a superposition current control part which controls the superposition current in the superposition time controlled by said superposition time control part.
10

6. The light source drive as claimed in claim 3, wherein:

said superposition time control part controls the superposition time according to a change amount of the drive current.

20

7. The light source drive as claimed in claim 5, wherein:

25 said superposition time control part controls

the superposition time according to a change amount of the drive current.

5

8. The light source drive as claimed in claim 4, wherein:

said superposition current control part
10 controls the superposition current value according to a change amount of the drive current.

15

9. The light source drive as claimed in claim 5, herein:

said superposition current control part
controls the superposition current value according to a
20 change amount of the drive current.

25

10. A light source drive which modulates a

light source so as to cause the same to emit a light,
comprising:

an output impedance control part which changes
an output impedance value of a drive current output part
5 which provides a drive current to said light source, for
a predetermined time period near at least one of a
rising-up part and a decaying-down part of a waveform of
the drive current.

10

11. A light source drive which modulates a
light source so as to cause the same to emit a light,
15 comprising:

a MOS transistor connected in parallel with a
drive current output part which outputs a drive current
to said light source; and

a voltage control part which applies a voltage
20 to a gate of said MOS transistor such that said MOS
transistor enters a linear region for a predetermined
time period near at least one of a rising-up part and a
decaying-down part of a waveform of the drive current.

25

12. The light source drive as claimed in
claim 10, further comprising:

a time control part which controls said
predetermined time period.

5

13. The light source drive as claimed in
10 claim 11, further comprising:

a time control part which controls said
predetermined time period.

15

14. The light source drive as claimed in
claim 10, further comprising:

a resistance value control part which controls
20 said output impedance value.

25

15. A light source drive which modulates a

light source so as to cause the same to emit a light,
comprising:

- a superposition current generation part which generates a superposition current approximately
5 corresponding to a charging/discharging current needed for a capacitance occurring in parallel to said light source for a predetermined time period near at least one of a rising-up part and a decaying-down part of a waveform of a drive current of said light source;
- 10 an addition/subtraction part which adds to or subtracts from the drive current the superposition current generated by said superposition current generation part; and
- an output impedance control part which changes
15 an output impedance value of a drive current output part which provides the drive current to said light source, for a predetermined time period near at least one of a rising-up part and a decaying-down part of a waveform of the drive current.

20

- 16. A light source drive which modulates a
25 light source so as to cause the same to emit a light,

comprising:

a superposition signal generation part which generates a superposition signal which indicates a predetermined time period near at least one of a rising-
5 up part and a decaying-down part of a waveform of a drive current of said light source;

a superposition current generation part which generates a superposition current approximately corresponding to a charging/discharging current needed
10 for a capacitance occurring in parallel to said light source based on the superposition signal generated by said superposition signal generation part;

an addition/subtraction part which adds to or subtracts from the drive current the superposition
15 current generated by said superposition current generation part; and

an output impedance control part which changes an output impedance value of a drive current output part which provides the drive current to said light source,
20 for a predetermined time period near at least one of a rising-up part and a decaying-down part of a waveform of the drive current.

17. A light source drive which modulates a light source so as to cause the same to emit a light, comprising:

5 a waveform shaping part which corrects a deformation of a light waveform of the light to be emitted from said light source; and

a waveform shaping time control part which controls a time period for which said waveform shaping part performs a waveform shaping operation.

10

18. A light source drive comprising:

15 a light source modulation part which modulates a light source so as to cause the same to emit a light;

a superposition current generation part which generates a superposition current in a predetermined amount for a predetermined time period near at least one
20 of a rising-up part and a decaying-down part of a waveform of a drive current for said light source;

an addition/subtraction part which adds to or subtracts from the drive current the superposition current generated by said superposition current
25 generation part; and

a superposition time control part which controls said predetermined time period so as to cause it to have a predetermined value.

5

19. The light source drive as claimed in claim 18, wherein:

10 said superposition current generation part comprises a first delay part which controls a delay amount according to a current amount provided thereto so as to generate said predetermined time period;

 said light source drive further comprises:

15 an oscillation part which comprises a second delay part having a characteristic which is equivalent to said first delay part;

 a delay time control part which controls a current provided to said oscillation part so that the
20 oscillation frequency of said oscillation part becomes a predetermined frequency; and

 a part which determines the current provided to said first delay part of said superposition current generation part based on the current value controlled by
25 said delay time control part.

20. A light source drive comprising:

a light source modulation part which modulates
a light source so as to cause the same to emit a light;

an output impedance control part which changes
5 an output impedance value of said light source
modulation part for a predetermined time period near at
least one of a rising-up part and a decaying-down part
of a waveform of a drive current for said light source;
and

10 a time control part which controls said
predetermined time period so as to cause it to have a
predetermined value.

15

21. The light source drive as claimed in
claim 20, wherein:

said output impedance control part comprises a
20 first delay part which controls a delay amount according
to a current amount provided thereto so as to generate
said predetermined time period; and

said light source drive further comprises:

an oscillation part which comprises a second
25 delay part having a characteristic which is equivalent

to said first delay part;

a delay time control part which controls a
current provided to said oscillation part so that the
oscillation frequency of said oscillation part becomes a
5 predetermined frequency; and

a part which determines the current provided
to said first delay part of said output impedance
control part based on the current value controlled by
said delay time control part.

10

22. A light source drive comprising:

15 a light source modulation part which modulates
a light source so as to cause the same to emit a light;

a superposition current generation part which
generates a superposition current in a predetermined
amount for a first predetermined time period near at
20 least one of a rising-up part and a decaying-down part
of a waveform of a drive current for said light source;

an addition/subtraction part which adds to or
subtracts from the drive current the superposition
current generated by said superposition current
25 generation part;

an output impedance control part which changes
an output impedance value of said light source
modulation part for a second predetermined time period
near at least one of a rising-up part and a decaying-
5 down part of a waveform of a drive current for said
light source; and

a time control part which controls said first
predetermined time period and said second predetermined
time period so as to cause them to have predetermined
10 values.

15 23. The light source drive as claimed in
claim 22, wherein:

said superposition current generation part
comprises a first delay part which controls a delay
amount according to a current amount provided thereto so
20 as to generate said first predetermined time period;

said output impedance control part comprises a
second delay part which has a characteristic equivalent
to that of said first delay part of said superposition
current generation part, and thereby generates said
25 second predetermined time period; and

said light source drive further comprises:

an oscillation part which comprises a third delay part having a characteristic which is equivalent to said first delay part;

5 a delay time control part which controls a current provided to said oscillation part so that the oscillation frequency of said oscillation part becomes a predetermined frequency; and

 a part which determines the current provided
10 to said first delay part of said superposition current generation part and the current provided to said second delay part of said output impedance control part based on the current value controlled by said delay time control part.

15

24. The light source drive as claimed in
20 claim 19, further comprising:

a communication part which performs a communication operation for data and command based on a clock signal having a predetermined frequency; and

a part detecting the oscillation frequency of
25 said oscillation part by counting the number of pulses

output from said oscillation part during a predetermined frequency detection period generated based on said clock signal.

5

25. The light source drive as claimed in claim 21, further comprising:

10 a communication part which performs a communication operation for data and command based on a clock signal having a predetermined frequency; and
 a part detecting the oscillation frequency of said oscillation part by counting the number of pulses
15 output from said oscillation part during a predetermined frequency detection period generated based on said clock signal.

20

26. The light source drive as claimed in claim 23, further comprising:

 a communication part which performs a
25 communication operation for data and command based on a

clock signal having a predetermined frequency; and

a part detecting the oscillation frequency of
said oscillation part by counting the number of pulses
output from said oscillation part during a predetermined
5 frequency detection period generated based on said clock
signal.

10

27. The light source drive as claimed in
claim 24, wherein:

said communication part performs a
communication operation of transferring the data and
15 command in serial in an order of an address and the data
based on the clock signal at the predetermined
frequency; and

said predetermined frequency detection period
comprises a data communication period in case said
20 address indicates a detection of a frequency of a high-
frequency signal.

25

28. The light source drive as claimed in claim 25, wherein:

said communication part performs a communication operation of transferring the data and
5 command in serial in an order of an address and the data based on the clock signal at the predetermined frequency; and

said predetermined frequency detection period comprises a data communication period in case said
10 address indicates a detection of a frequency of a high-frequency signal.

15

29. The light source drive as claimed in claim 26, wherein:

said communication part performs a communication operation of transferring the data and
20 command in serial in an order of an address and the data based on the clock signal at the predetermined frequency; and

said predetermined frequency detection period comprises a data communication period in case said
25 address indicates a detection of a frequency of a high-

frequency signal.

5

30. The light source drive as claimed in
claim 24, wherein:

said communication part performs a
communication operation of transferring the data and
10 command in serial in an order of an address and the data
based on the clock signal at the predetermined
frequency; and

said predetermined frequency detection period
comprises the address and data communication period.

15

31. The light source drive as claimed in
20 claim 25, wherein:

said communication part performs a
communication operation of transferring the data and
command in serial in an order of an address and the data
based on the clock signal at the predetermined
25 frequency; and

said predetermined frequency detection period
comprises the address and data communication period.

5

32. The light source drive as claimed in
claim 26, wherein:

said communication part performs a
10 communication operation of transferring the data and
command in serial in an order of an address and the data
based on the clock signal at the predetermined
frequency; and

said predetermined frequency detection period
15 comprises the address and data communication period.

20 33. An optical information recording method
of forming a record mark on a recording medium by
applying a light emitted from a light source in a form
of a pulse series, comprising the steps of:

a) adding a pulse of predetermined power for a
25 predetermined time period after near a rising-up part of

each of at least some pulses of the pulse series; and

b) controlling a pulse width of the pulse thus added so as to control the formation of the record mark.

5

34. An optical information recording method of forming a record mark on a recording medium by
10 applying a light emitted from a light source in a form of a pulse series, comprising the steps of:

a) adding a first addition pulse of predetermined power for a predetermined time period after near a rising-up part of each of at least some
15 pulse of the pulse series;

b) adding a second addition pulse of predetermined power for a predetermined time period after near a decaying-down part of each of said at least some pulses of the pulse series; and

20 c) controlling a pulse width of the first addition pulse thus added and a pulse width of the second addition pulse thus added so as to control the formation of the record mark.

25

35. An optical information recording method of forming a record mark on a recording medium by applying a light emitted from a light source in a form of a pulse series, comprising the steps of:

- 5 a) adding or subtracting a predetermined addition current to a drive current of said light source for a predetermined time period after near a rising-up part or a decaying-down part of each of at least some pulses of the pulse series;
- 10 b) determining the predetermined time for the addition current such that a part of the addition current is approximately appropriated for charging/discharging a capacitance occurring in parallel to said light source and the remaining part of said
- 15 addition current is used as an addition power to be applied so as to control the formation of the record mark.

20

36. The optical information recording method as claimed in claim 33, wherein:

- a pulse width applied for a top pulse of the
- 25 pulse series, a pulse width applied for a last pulse of

the pulse series and a pulse width applied for the other intermediate pulses are set respectively.

5

37. The optical information recording method as claimed in claim 34, wherein:

10 a pulse width applied for a top pulse of the pulse series, a pulse width applied for a last pulse of the pulse series and a pulse width applied for the other intermediate pulses are set respectively.

15

38. The optical information recording method as claimed in claim 35, wherein:

20 a pulse width applied for a top pulse of the pulse series, a pulse width applied for a last pulse of the pulse series and a pulse width applied for the other intermediate pulses are determined respectively.

25

39. The optical information recording method
as claimed in claim 33, wherein:

the pulse width of each addition pulse thus
added is determined according to lengths of information
5 occurring preceding and subsequent to a relevant record
mark.

10

40. The optical information recording method
as claimed in claim 34, wherein:

the pulse width of each addition pulse thus
added is determined according to lengths of information
15 occurring preceding and subsequent to a relevant record
mark.

20

41. The optical information recording method
as claimed in claim 35, wherein:

the pulse width of each addition pulse thus
added is determined according to lengths of information
25 occurring preceding and subsequent to a relevant record

mark.

5

42. The optical information recording method
as claimed in claim 36, wherein:

the pulse width of the addition pulse added to
the top pulse is determined according to the mark length
10 of the relevant record mark and the immediately
preceding space length, and the pulse width of the
addition pulse added to the last pulse is determined
according to the mark length of the relevant record mark
and the immediately subsequent space length.

15

43. The optical information recording method
20 as claimed in claim 37, wherein:

the pulse width of the addition pulse added to
the top pulse is determined according to the mark length
of the relevant record mark and the immediately
preceding space length, and the pulse width of the
25 addition pulse added to the last pulse is determined

according to the mark length of the relevant record mark
and the immediately subsequent space length.

5

44. The optical information recording method
as claimed in claim 38, wherein:

the pulse width of the addition pulse added to
10 the top pulse is determined according to the mark length
of the relevant record mark and the immediately
preceding space length, and the pulse width of the
addition pulse added to the last pulse is determined
according to the mark length of the relevant record mark
15 and the immediately subsequent space length.

20 45. An optical information recording
apparatus for forming a record mark on a recording
medium by applying a light emitted from a light source
in a form of a pulse series, comprising:

an addition current generation part which
25 generates an addition current in a predetermined value

for a predetermined time period after near a rising-up
part of each of at least some pulses of the pulse
series;

an addition time setting part which determines
5 said predetermined time period for the addition current;
and

an adding part which adds the addition current
to a drive current for said light source.

10

46. An optical information recording
apparatus for forming a record mark on a recording
15 medium by applying a light emitted from a light source
in a form of a pulse series, comprising:

an addition current generation part which
generates an addition current in a predetermined value
for a predetermined time period after near a rising-up
20 part or a decaying-down part of each of at least some
pulses of the pulse series;

an addition time setting part which determines
said predetermined time period for the addition current;
and

25 an adding/subtracting part which

adds/subtracts the addition current to/from a drive current for said light source.

5

47. An optical information recording apparatus for forming a record mark on a recording medium by applying a light emitted from a light source in a form of a pulse series, comprising:

10 an addition current generation part which generates an addition current in a predetermined value for a predetermined time period after near a rising-up part or a decaying-down part of each of at least some pulses of the pulse series;

an addition time setting part which sets the predetermined time for the addition current such that a part of the addition current is approximately appropriated for charging/discharging a capacitance occurring in parallel to said light source and the remaining part of said addition current is used as an addition power to be applied; and

20 an adding/subtracting part which adds/subtracts the addition current to/from a drive current for said light source.

25

48. The optical information recording
apparatus as claimed in claim 45, wherein:

10 said addition part setting part determines a
pulse width of the addition pulse applied for a top
5 pulse of the pulse series, a pulse width of the addition
pulse applied for a last pulse of the pulse series and a
pulse width of the addition pulses applied for the other
intermediate pulses respectively.

10

49. The optical information recording
apparatus as claimed in claim 46, wherein:

15 said addition part setting part determines a
pulse width of the addition pulse applied for a top
pulse of the pulse series, a pulse width of the addition
pulse applied for a last pulse of the pulse series and a
pulse width of the addition pulses applied for the other
20 intermediate pulses respectively.

25 50. The optical information recording

apparatus as claimed in claim 47, wherein:

5 said addition part setting part determines a
pulse width of the addition pulse applied for a top
pulse of the pulse series, a pulse width of the addition
pulse applied for a last pulse of the pulse series and a
pulse width of the addition pulses applied for the other
intermediate pulses respectively.

10

51. The optical information recording
apparatus as claimed in claim 45, wherein:

15 said addition part setting part determines the
pulse width of each addition pulse added according to
lengths of information occurring preceding and
subsequent to a relevant record mark.

20

52. The optical information recording
apparatus as claimed in claim 46, wherein:

25 said addition part setting part determines the
pulse width of each addition pulse added according to

lengths of information occurring preceding and
subsequent to a relevant record mark.

5

53. The optical information recording
apparatus as claimed in claim 47, wherein:

said addition part setting part determines the
10 pulse width of each addition pulse added according to
lengths of information occurring preceding and
subsequent to a relevant record mark.

15

54. The optical information recording
apparatus as claimed in claim 48, wherein:

said addition part setting part determines the
20 pulse width of the addition pulse added to the top pulse
according to the mark length of the relevant record mark
and the immediately preceding space length, and
determines the pulse width of the addition pulse added
to the last pulse according to the mark length of the
25 relevant record mark and the immediately subsequent

space length.

5

55. The optical information recording apparatus as claimed in claim 49, wherein:

said addition part setting part determines the pulse width of the addition pulse added to the top pulse
10 according to the mark length of the relevant record mark and the immediately preceding space length, and determines the pulse width of the addition pulse added to the last pulse according to the mark length of the relevant record mark and the immediately subsequent
15 space length.

20

56. The optical information recording apparatus as claimed in claim 50, wherein:

said addition part setting part determines the pulse width of the addition pulse added to the top pulse according to the mark length of the relevant record mark
25 and the immediately preceding space length, and

determines the pulse width of the addition pulse added to the last pulse according to the mark length of the relevant record mark and the immediately subsequent space length.